

GROUND VEHICLES

Accelerating the Use of Alternative Fuels

Alternative fueled vehicles have been receiving a great deal of attention in recent years. While automobile manufacturers continue to announce plans for developing new models and consumers are starting to drive them, the United States Air Force has been working with vehicles powered with alternative fuels for more than 15 years.

The Air Force first began exploring the possibility of alternative-fueled vehicles in 1992 by working with automobile manufacturers to find the right combination of reliability, performance, and cost. Several technologies were evaluated, but none were ready for operational use.

Through the years industry has begun improving performance and in 1997 the Air Force began using electric vehicles and cargo & utility vehicles powered by compressed natural gas. By 1999, the Air Force vehicle fleet included flex fuel vehicles using ethanol

(E85), with conventional diesel vehicles capable of using biodiesel (B20). Since 1999, the Air Force reduced fossil fuel consumption for ground vehicles by 15%. In Fiscal Year 2006 (FY06), the average fuel economy reached 21.1 miles per gallon (mpg), a 4.1 mpg improvement over the 1999 baseline.

Today more than 86,000 vehicles and thousands of pieces of support equipment are responsible for 4% of all Air Force energy consumption. While all cannot be converted to non-fossil fuels, the Air Force continues to expand its use of alternative energy vehicles through test and use of hybrid systems, synthetic fuels and hydrogen. Thirteen more fossil fuel conservation projects are currently planned.

Low-speed vehicles, powered by electricity, are helping to save the Air Force energy. There are currently more than 5,000 low-speed vehicles in the fleet.



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The HydraFLX deployable fuel cell is brought to the back of a C-17 Globemaster III at Hickam Air Force Base, Hawaii. This system is being tested as an alternative energy source.

Employing Hybrids and Alternative Fueled Vehicles

Hybrid vehicles and equipment use both generators and stored energy, such as batteries, to meet peak requirements. Flex fueled vehicles are designed to run on gasoline or ethanol. In FY07 the Air Force used over 420,000 gallons of E-85 and continues to expand the infrastructure with service stations and pumps dispensing E-85. The Air Force inventory of in-service alternative and flex fuel infrastructure and vehicles includes:

- Over 5300 flex fuel and hybrid vehicles
- 19 bases currently dispensing E85 with 17 more forecasted in the next five years

- 60 bases currently dispensing B20
- 32 additional locations using available E85 commercial resources
- Hydrogen fuel cell technology infrastructure and vehicles currently being tested at Selfridge Air National Guard Base, MI, and Hickam AFB, HI, with further tests beginning in FY08 at Robins AFB, GA, and McGuire AFB, NJ, in FY09
- Lithium ion battery powered electric vehicles being tested at Hickam AFB, HI

Utilizing Electric and Low-Speed Vehicles

Electric vehicles are powered solely by electric motors and rechargeable batteries. Low-speed vehicles use a variety of energy sources, including electric, ethanol, conventional gasoline and diesel, and have a top speed of 35 miles per hour. The Air Force has over 5,000 low-speed vehicles in the fleet along with electric-powered pick-ups and forklifts. A battery-powered, regenerator refueling cart is currently in use at McGuire Air Force Base.

The Air Force is also working with industry to develop alternative-fuel technology to support ground equipment and facilities such as bare base assets and modular mobile units. These projects are advancing hydrogen generation, storage and refueling capabilities, and helping to increase fuel efficiency.

As the Air Force continues to research, test, and convert vehicles and equipment to run on a variety of alternative fuels, we are well on our way toward reducing fossil fuel consumption by 2% on an annual basis while increasing greater use of alternative fuels by 10%. Before adding new technology to the fleet, all vehicles must meet the demanding needs of the Air Force without draining resources and manpower. More importantly, they cannot have a negative impact on mission readiness.